

DEVELOPMENT DYNAMICS OF HEALTH AND SOCIAL INFRASTRUCTURE FOR THE LONG-TERM CARE - THE CASE OF THE POSAVJE REGION

DINAMIKA RAZVOJA ZDRAVSTVENE IN SOCIALNE INFRASTRUKTURE ZA DOLGOTRAJNO OSKRBO - PRIMER POSAVSKE REGIJE

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ABSTRACT

Keywords:

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Background and purpose: The populations of rural areas across Europe, especially Slovenia, are ageing rapidly and the areas themselves are becoming depopulated. Therefore, this study aims to contribute to our understanding of the population dynamics and provide a method for forecasting housing and other long-term care needs.

Method: The surveys questioned those responsible for long-term care, the caretakers in institutional care, and current and potential homecare users in rural areas of Slovenia. We wanted to discover what they considered as crucial in the process of long-term care deinstitutionalization. Our 2020-2050 projections are based on the surveys conducted across 38 municipalities in the Eastern Slovenian region and an in-depth empirical study in Posavje. The results are embedded in the demographic projections and the multistate transition model of the declining functional capacities to forecast the needed housing facilities and human resources.

Results: The results are the time series of required capacities. Around 60% of respondents in Slovenian rural areas believe that even a better organization of homecare would not allow them to stay at home until death due to inadequately built housing and the absence of a continuous presence of caregivers. These findings were included in the projections. Therefore, community care in the network of Smart Silver Villages was proposed.

Discussion: Investments are needed to renovate the housing stock of older adults and construct sheltered, assisted living housing and specialized households in the community. Moreover, proper education and training of human resources would increase the output. In addition, financial solutions are advised to develop Smart Silver Villages.

IZVLEČEK

Ključne besede:

staranje, socialna infrastruktura, gerontologija, arhitekturno okolje, dolgotrajna oskrba, srebrne vasi

Motivacija in namen: Podeželska območja po Evropi in v slovenskih regijah se hitro starajo in vse bolj praznijo. Zato je naš cilj prispevati k razumevanju te dinamike in podati metodo za projekcije potreb po nastanitvi in dolgotrajni oskrbi starejših na podeželju ter s tem revitalizacijo slovenskih pokrajin.

Metoda: Anketirali smo oskrbovalce in druge osebe v podeželskih občinah, odgovorne za dolgotrajno oskrbo, oskrbovalce in potencialne uporabnike dolgotrajne oskrbe in jih povprašali, kaj je v procesu deinstitutionalizacije najpomembnejše. Naši zaključki temeljijo na raziskavah, opravljenih v 38 občinah vzhodnoslovenske regije, in poglobljeni empirični raziskavi v regiji Posavje, kjer smo na temelju demografskih projekcij prebivalstva in aktuarskega modela pojemanja mnogoterih padajočih funkcionalnih zmogljivosti, kakor tudi iz želja prebivalstva, ki izhajajo iz anket, napovedali dinamiko potrebnih prostorskih kapacitet in človeških virov za dolgotrajno oskrbo.

Rezultati: Za primer Posavja smo izpeljali časovno vrsto potrebnih zmogljivosti, upoštevajoč tudi, da je kar 60 % anketirancev na slovenskem podeželju prepričanih, da jim tudi boljša organizacija oskrbe na domu ne bi omogočila bivanja doma do smrti zaradi neustrezno zgrajenih stanovanj in nezmožnosti zagotavljanja stalne navzočnosti negovalcev, kar smo upoštevali v projekcijah.

Razprava: Potrebne so naložbe v obnovo obstoječega stanovanjskega fonda ali izgradnjo oskrbovanih stanovanj oziroma varovanih stanovanj ali gospodinjstkih skupnosti kot samostojnih enot v skupnostni oskrbi, zagotoviti pa je treba tudi več oskrbovalcev, torej povečati obseg izobraževanja in usposabljanja na tem področju. Dane so tudi usmeritve v iskanje ustreznih finančnih virov, predvsem v sklopu evropske iniciative pametnih ekovasi.

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1 INTRODUCTION

1.1 Ageing and long-term care

The proportion of people aged over 80 years is forecasted to triple in the next 50 years, driving demand for more intensive long-term care (LTC) and housing solutions. This demographic development drives the growth of the health care and LTC expenditures, and puts pressure on LTC delivery. However, we consider demographic changes as new and exciting opportunities for rural residents and rural social entrepreneurship (1-4). The question is: “What would be the optimal construction dynamics of the assisted living facilities and the projection of staff needed for eldercare? What are the useful methods that can help develop optimal decision-making procedures at given constraints?” Due to their purchasing power, older adults in Europe constitute a potentially significant market of the silver economy (5). Knowing ageing dynamics is essential for the health and LTC sector, leisure industry and logistics, the housing market, and insurance industry (5-8). While it is assumed that people’s ageing may positively impact social science and technology, it is necessary to accurately study the economic potential of older people in rural areas. Moreover, educational innovations in LTC still pose a significant challenge (6-9). Globally, four basic types of housing for older adults are available: (a) for independent living, (b) for assisted living, (c) for memory care, and (d) nursing homes (in Slovenia, the homes for older adults—DSO), also nursing hospitals (NH) as accommodation with better medical equipment and appropriately skilled nursing staff. These facilities can be organized (a) in a single building such as that in Slovenian cases of nursing homes (we shall use the acronym DSO for the Slovenian cases); (b) as campus-like continuous care retirement communities (CCRC), or (c) like continuous care of dispersed smaller units of independent and assisted living, with higher spatial standards or in cohabitation in a functional region as proposed in this paper, where the information and communication platform makes overcoming distances cheaper (3). There are three reasons for the third choice: (a) older adults prefer to stay as close as possible to their communities and relatives; (b) they wish to feel safe, and (c) modern digital technologies enable cheaper managing of such dispersed provision of care.

Slovenia has developed an “Active Ageing Strategy” (10). The strategy’s fundamental goal is to live (a) active, (b) healthy, (c) independent and safe, and (d) in an intergenerational cohabitation, as stated in (10-14). Based on these documents and the initiative of the smart eco-social villages, as initiated by MEP Bogovič and MEP Szanyi in the European Parliament (15), as well as on the social farming and green care initiatives (16-20), we (a) studied discrepancies between the official documents and the wishes of the older adults explained in more than 500 interviews, from where we collected qualitative

and quantitative data, (b) calculated the demographic projections in the local action groups (LAGs—Slovenian LAS) as the non-profit-making composition made up of public and private organizations from rural municipalities, having a broad representation from different socio-economic sectors in Eastern Slovenian region (21), and (c) developed a Multistate Transition Model (MTM) for the projections of required housing and human resources as an upgrade of the actuarial model (6). In the paper, implementation was considered in LAG as a non-profit group composed of local communities, like municipalities of a compact territory that manage LEADER projects in European rural areas (21). The composition of Slovenian LAGs is presented in Figure 1. Based on our surveys, the details of which are presented in (3), we realized that more than 60% of older adults in rural areas assume that they do not live in safe and accessible housing units and do not believe that they can receive care in their homes due to construction barriers and loneliness. They assume that they do not live in enough safe and accessible housing units and have no relatives nearby willing even to offer partial help. Additionally, up to 20 hours per week of care is not intensive enough to provide for their needs at home when their care category falls in level 2 or 3 of care (he details of this categorization can be seen in Article 24 of Regulation (22)). However, they would like to receive care close to their social networks. Therefore, we need more smaller units also for institutional care or care in the community. Dispersed development of a larger number of smaller sheltered housing units and greenhouses (cohabitations) in a functional region of a LAS could offer more activities in the less populated areas. This provides greater independence and autonomy to older adults than living in a DSO and ensures higher security than a poorly adapted old family home.

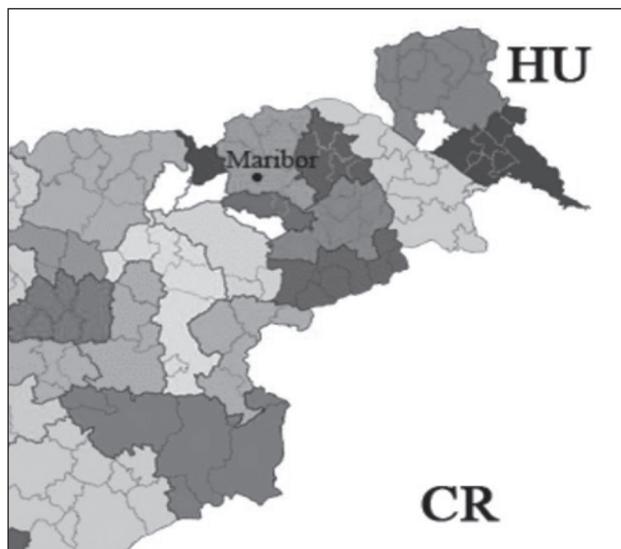


Figure 1. Composition of Slovenian municipalities in LAGs we studied.

In Section 3, we present the projections of housing needs, based on the actuarial methodology of healthy life projections (2, 6), where also the respondents' wishes from our survey are considered. Additionally, projections of required human resources for LTC are calculated based on the constraints of norms and standards of care in DSO. Section 4 discusses the method that supports the decisions on optimal construction dynamics of some assisted living facilities and projects the staff needed for eldercare, hence complementing an education plan. From the general description of these procedures, we turn our attention to the quantitative methods suggested for Slovenian long-term planning in LTC (22, 23).

2 METHODS

2.1 Multistate transition model

We raised a question about the optimal construction dynamics of assisted living facilities and the projection of staff needed for eldercare. Therefore, we need:

- (a) to consider the projection of the number of older adults who would need an adapted housing because of their declined functional capacities;
- (b) to study what kind of facilities they would prefer;
- (c) to find what is the expected intensity or structure of care needed for each cohort.

From these basic answers, we can develop the optimal construction dynamics and find other related needs of older adults. Our article is based on the MTM, developed further from (6), and considered in the spatial planning context (3). The impact of moving among different environments and intensity levels of care depends on the built environment, the culture and wishes, the health of the older adults and their functional capabilities, and their financial capacity. The living options are (a) to stay at their conventional home (FH: $i=0$), (b) to adapt their home/adapted family house (adFH: $i=1$), (c) independent living housing/sheltered housing (SH: $i=2$), or (d) housing units with care (HwC); HwC facilities could be made available in totally independent housing units, with all housing rights and outsourcing services, including healthcare OS ($i=3$), or in the green care, in the context of social farming, and other forms of cohabitation, which we named greenhouses GH ($i=4$). They could also move to a nursing home. In Slovenia, such a nursing home is a residential facility DSO ($i=5$). Then, they move to a health facility like a nursing hospital (Slovenian: "negovalne bolnišnice"- NH: $i=6$). Due to the reversibility, the multiple decrement model, as developed in (6), can be remodelled into the MTM. The last state ($i=7$) is to be dead.

We denote the initial state in the family home as state 0, and the probability of transitions from the environment representing the parent node i to the child node j of a transition graph at various ages by

$$q_x^{(i,j)} = \frac{M_x^{(i,j)}}{S_x^{(i)}}; j=1, 2, 3, 4; j > i; p_x^{(i)} = q_x^{(i,i)} \text{ if } i = j, \tag{1}$$

where $M_x^{(i,j)}$ is the number of residents that move from environment i to j , and $S_x^{(i)}$ is the total number of residents who were previously living in $i < j$. The final allocation of residents by type of housing environment for each cohort (x) in the year τ is described in the matrix [2], modifying the model in (6). Vector $E_{x,\tau}$ represents the structure of various settings where residents in the cohort x years old live in the year τ .

$$\begin{matrix} E_{x,\tau} = \\ [E_x^{(0)} E_x^{(1)} E_x^{(2)} E_x^{(3)} E_x^{(4)} E_x^{(5)} E_x^{(6)}]_{\tau} \end{matrix} \tag{2}$$

The allocation of residents in the year $\tau+1$ is given by

$$\begin{aligned} E_{x+1,\tau+1} &= E_{x,\tau} P_{x,\tau} = \\ & \begin{bmatrix} E_x^{(0)} & E_x^{(1)} & E_x^{(2)} & E_x^{(3)} & E_x^{(4)} & E_x^{(5)} & E_x^{(6)} \\ p_x^{(0)} & q_x^{(0,1)} & q_x^{(0,2)} & q_x^{(0,3)} & q_x^{(0,4)} & q_x^{(0,5)} & q_x^{(0,6)} & q_x^{(0,7)} \\ 0 & p_x^{(1)} & q_x^{(1,2)} & q_x^{(1,3)} & q_x^{(1,4)} & q_x^{(1,5)} & q_x^{(1,6)} & q_x^{(1,7)} \\ 0 & 0 & p_x^{(2)} & q_x^{(2,3)} & q_x^{(2,4)} & q_x^{(2,5)} & q_x^{(2,6)} & q_x^{(2,7)} \\ 0 & 0 & 0 & p_x^{(3)} & q_x^{(3,4)} & q_x^{(3,5)} & q_x^{(3,6)} & q_x^{(3,7)} \\ 0 & 0 & 0 & 0 & p_x^{(4)} & q_x^{(4,5)} & q_x^{(4,6)} & q_x^{(4,7)} \\ 0 & 0 & 0 & 0 & 0 & p_x^{(5)} & q_x^{(5,6)} & q_x^{(5,7)} \\ 0 & q_x^{(6,1)} & q_x^{(6,2)} & q_x^{(6,3)} & q_x^{(6,4)} & q_x^{(6,5)} & p_x^{(6)} & q_x^{(6,7)} \end{bmatrix}_{\tau} \\ &= [E_{x+1}^{(0)} E_{x+1}^{(1)} E_{x+1}^{(2)} E_{x+1}^{(3)} E_{x+1}^{(4)} E_{x+1}^{(5)} E_{x+1}^{(6)}]_{\tau+1} \end{aligned} \tag{3}$$

2.2 Methods of determining transition probabilities

The empirical study of 38 municipalities, joined in five different LAGs: LAG Posavje, LAG Goričko, LAG Pri dobrih ljudeh, LAG Obsotelje and Kozjansko, and LAG Prlekija is presented in this article. We have conducted an inquiry among the institutions responsible for the care and two groups of interviews among those in institutional care and those whose functional capacities allow them to stay independent in a community.

According to the population projections considering a "no migration" scenario (2), the share of the oldest layer of the population in Slovenia (80+), including in the Posavje region (3), is expected to triple in the next 30 years (see Figure 2a). For forecasting the expected number of LTC users of various housing options and services in the next 30 years:

- (a) we made an actuarial investigation on the age structure of inhabitants and their projected age structure;

(b) from the history, we studied the structure of older adults who needed the care of first, second, third, and fourth category of care (unpublished sources of The Health Insurance Institute of Slovenia);

(c) after knowing the relative frequency of cohorts, with inhabitants being expected to be in one of the care categories, we have conducted interviews among the institutions. These institutions are responsible for care at the municipality level (38 representatives of municipalities, 38 representatives of centres for social work, and representatives of all institutional care facilities). We conducted two groups of interviews among those with housing in institutional care and those whose functional capacities allow them to stay independent in a community or are in a form of homecare.

Because many older adults find it difficult to answer a survey in writing, based on the pre-prepared questionnaire as a form consisting of a series of written multiple-choice questions, interviews were set up between the interviewer (nurse) and respondents. They answered the multiple-choice questions and explained their choice where necessary (semi-structured), which gave us better insight into these topics. The number of people who wanted to use one of the housing and care modalities was calculated. Probability as the relative number of inhabitants age x in each mode was calculated and used in the MTM.

3 RESULTS OF THE CASE STUDIES

3.1 The case study in the Posavje region

Due to the age of the interviewees, short interviews replaced previously planned surveys. Over 60% of the respondents (among over 500 older adults) believe that even a better homecare organization would not allow them to stay at home until death. 85% of them answered that due to inadequately built housing and the absence of a continuous presence of caregivers, they think that the best solution is to transfer to a DSO in lieu of better solution. Around 71% of those still living in the community will shift to a DSO only if they have difficulty overcoming vertical obstacles (stairs, elevators). Because of their desire to stay close to relatives, they would prefer community care in an assisted living housing or greenhouses that are less than 5 km from their family home. Such arrangements would provide opportunities for better intergenerational coexistence and allow them to be close to their dearest relatives and friends. Therefore, affordable housing arrangements in sheltered, assisted living housing and greenhouses of integrated care are the desired option of 97% of residents in DSOs and 67% of older persons still living at home. From this, we can roughly conclude that more than 90% of those living in DSO in Slovenia, in care category I or II, and more than 60% of those still living at

home would opt for community care arrangements in the Smart Silver Village (SSV) network when their functional capabilities fall below the category II threshold ($p < 0.001$). Silver Village is assumed as a village where the built environment does not place physical barriers for older adults to socialize and communicate in space. Since such networks can be improved with new ICT solutions, we are talking about “smart” silver villages. The details are described in (3). Based on the population projections for these areas and the surveys mentioned above, the optimal dynamics of housing for older adults and required human resources are calculated for Posavje.

Figure 2a shows the population projection for the 80+ cohort and the ratio between the active population and the 80+ cohort for the Posavje region (Figure 2b). The results in other LAGs are similar or worse.

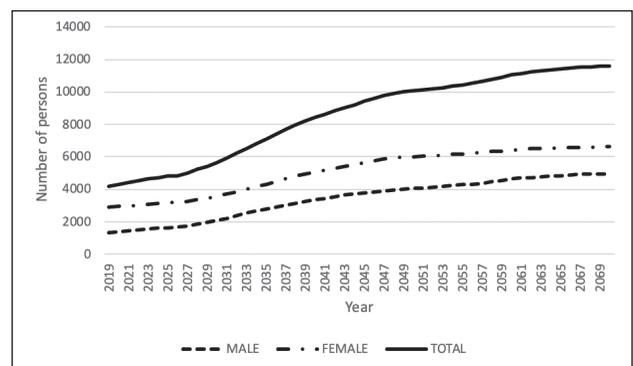


Figure 2a. Demographic projections for 2019-2070 of cohort 80+ in the Posavje region.

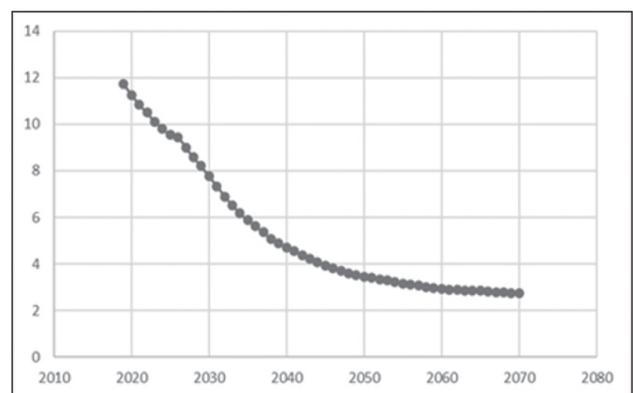


Figure 2b. The ratio between the active population and the population 80+ in the Posavje region.

3.2 Projections of needs in five LAGs

Table 1. The projection of LTC demand in five LAGs given today's structure of housing and services based on the no-migration demographic projections.⁴

AG	Year	Cohorts				Sum	Patronage nurses employed	Included in homecare	Demand in NH ^{2,5}
		<15	15-64	65-79	80+				
LAS Posavje	2019	11.149	48.958	11.273	4.179	75.559	34	317	1.398
	2050	9.210	34.888	14.019	10.066	68.184	55 ¹	515	2.960
	Growth rate 2050/2019	-17	-29	24	141	-10		62	112
LAS Goričko 2020	2019	6.053	29.925	8.034	2.538	46.550	23	156	9353
	2050	5.036	19.387	8.893	6.376	39.692	35 ¹	235	2.0203
	Growth rate 2050/2019	-17	-35	11	151	-15		51	116
LAS Obsotelje in Kozjansko	2019	4.682	20.333	4.348	1.477	30.840	12	115	419
	2050	3.873	14.651	5.907	4.151	28.582	22 ¹	208	1.026
	Growth rate 2050/2019	-17	-28	36	181	-7		81	145
LAS Pri dobrih ljudeh 2020	2019	4.097	19.948	5.012	1.484	30.541	13	64	323
	2050	3.411	13.115	5.937	4.144	26.607	21 ¹	105	771
	Growth rate 2050/2019	-17	-34	18	179	-13		64	139
LAS Prlekija	2019	5.054	23.855	6.312	1.975	37.196	15	68	813
	2050	4.187	15.984	7.034	5.059	32.264	23 ¹	104	1.787
	Growth rate 2050/2019	-17	-33	11	156	-13		53	120

¹At the same standard of number of nurses per population

²Note that demand is more than 50% higher than existing capacity today in nursing homes- NHs

³Waiting line in LAG Pri dobrih ljudeh and LAG Prlekija is registered in LAG Goričko

⁴The calculations by authors based on the European population projection 2018 data - no migration scenario.

⁵Estimate of demand by 2050 (number of persons) assuming the same structure of applicants: 1/4 of the care recipients in the cohort 65-79 and 3/4 among the population 80+ (based on the no migration scenario)

Projection results for the population and categorization of needed care provided the following forecast of needed capacities of LTC, based on the MTM, as presented in Table 5. The projections in Table 5 are made under the assumption that no new solutions for community care will be developed. Therefore, there is assumed home care proportionally to people who will need the care category I or II only and those who will have an accessible environment tailored to their needs and safety. Additionally, we assumed that they would have the financial resources to enter nursing hospitals and a DSO when needed or categorized into care III.

Based on the demographic projections for each LAG, the given structure of care categories in LAGs, and the interviews, the forecast of LTC demand is presented in Table 1 if new facilities for community care are not developed (4). A more in-depth study was later conducted in the Posavje region. Based on the no-migration scenario (Figure 1), surveys, and the MTM, the projections of the LTC demand in the case of Posavje was studied in detail, keeping in mind that this LAG has been prepared for the development of community care, especially to build GHs

immediately; the expected expenditures for a GH of 24 inhabitants are provided in Table 2. Based on this and the methodology of EUROSTAT, (already available in May 2021), as improved in (2), Tables 3-6 were constructed. The assumption was that the structure of intensity of care from category I to III would stay the same as the structure of categories of care for residents of nursing homes in 2019.

3.3 Projected needs in the Posavje region

The rapid development of adequate housing and care capabilities is necessary to move some category I and II residents from a DSO to community care in Silver Villages and provide proper facilities for the most vulnerable older adults in waiting lines.

Table 2 presents the expenses of the greenhouses for those included in the national insurance plans (ZN); they would cover the salaries of one nurse and two medical technicians in integrated care (morning/afternoon/night) at 24 homes. In this case, we assume only two social caregivers, needed in the morning and one in the afternoon, who are to be paid by the municipality and the users.

Table 2. Expenditure of municipalities and users in 24 housing units of greenhouse facilities.

Variants	Number of employees per shift a/b/c****	Yearly for 528 h/month at 16€/h in €/year		User monthly 30% in €/month
		Total	Municipality 70%	
A*	5/5/3	36,608	25,626	457.6
B**	3/2/1	14,080	9,856	176
ZN***	1/1/1	0	0	0
Integrated care	2/1/0+1/1/1	7,040	4,928	88

*According to the currently valid norms of homecare (see (3) and (22-23)).

**Possible reduction also in the case of the category of care III with the partial help of relatives and volunteers. A high percentage of relatives and volunteers are willing to participate (3).

*** We assume that all patients are members of the health insurance scheme. From the expected structure of care categories and norms in DSO, we summarize the minimum requirements: 1 nurse and two medical technicians, each in their 8-hour shift.

**** Well-organized integrated care with partial help from relatives and norms in the NH for health-insured patients: a: morning; b: afternoon; c: night: a/b/c.

10% of housing units are assumed to be for married couples. This follows from the structure of our respondents in the 5 LAG field surveys and interviews. The demanded and needed capacities forecasted in Tables 3-6 based on the MTM extended from (6).

Table 3. Optimal construction dynamics of facilities in Posavje in terms of number of beds.

Year	Home-care	Nursing facilities				
		Without community care			With community care	
		Cat.I	Cat.II	Cat.III	Community OS+GH	Nursing home DSO+NH
2020	322	286	100	1046	735	697
2025	348	323	113	1180	830	787
2030	377	365	128	1332	936	888
2035	407	412	144	1503	1057	1002
2040	440	465	136	1696	1193	1131
2045	476	525	184	1915	1346	1276
2050	515	592	207	2161	1519	1441

Table 4. Projections of the structure of needs for providers in the Posavje region.

Year	U	adFH	OS+GH	DSO	NH
2025	1964	0.18	0.42	0.39	0.02
2030	2201	0.17	0.44	0.35	0.05
2035	2466	0.17	0.43	0.33	0.08
2040	2764	0.16	0.43	0.34	0.07
2045	3099	0.15	0.43	0.35	0.06
2050	3457	0.15	0.44	0.36	0.06

Notation

U-users

adFH-homecare

OS-sheltered-assisted living housing

GH-greenhouses and daily living-assisted living

DSO-Nursing home organised as today

NH-Nursing hospital for long-stay there

Table 5. Staff/user norms in healthcare and the required number of staff per user per unit for OS, GH, and NH.

Staff	Health care staff per facility		
	In OS per 30 users	In GH per 24 users	In DSO per 200 users
	Cat. I:II:III= 39%:14%:47%		
Nursing technician	1.98	1.59	19.74
Senior physio-therapist	0.18	0.15	1.32
Graduate of senior nurse	0.54	0.43	6.58
B.Sc. Work therapist	0.19	0.15	1.98
Nurse-caregiver	3.12	2.5	27.72
Server	0.57	0.45	0
Specialist doctor	0.02	0.01	0.1
Total	6.6	5.28	57.42

*The calculated values are derived from the expected structure of categories of care as given in the studied LAGs. Source: ZZS [18]

Table 6. The construction dynamics of the assisted living units and the projection of staff needed in the Posavje region.

Year	Homecare: Number of users (U), The health care staffs (HS) and primary + social care (P+SC) staff			Number of users (U), The health care staffs (HS) and primary + social care (P+SC) staff in OS			Max no. of flats in OS is 30	Number of users (U), the health care staffs (HS) and primary + social care (P+SC) staff in GH			Max no. of studios in GH is 24
	U	HC	P+SC*** 0.54/U	U	HC	P+SC*** 0.59/U	No. of OS*	U	HC	P+SC*** 0.54/U	No. of GH**
2025	348	76.7	188	202	44.4	99	7	103	22.7	25.8	5
2030	377	82.9	204	236	51.9	115.6	8	121	26.6	30.3	5
2035	407	89.4	220	259	57	126.9	8	132	29	33	6
2040	440	96.9	238	292	64.2	143.1	9	149	32.8	37.3	7
2045	476	104.8	257	330	72.6	161.7	10	168	37	42	7
2050	515	113.3	278	372	81.8	182.3	12	190	41.8	47.5	8

* Limit is 30 apartments with one or two beds. We consider that in each group, there are at least 10% of those with two beds (married couples)

**Article 8 of PRAV10060 stipulates that the maximum possible number of care recipients in one unit is 24.

***Max. for 20 hours weekly/U

According to some professionals working in the DSO of these LAGs, older adults in need of category I or II care would be better off living in community care. The construction dynamics also follow based on this opinion, as shown in Tables 3-6. Given the increase in the population aged 65+ cohort and 81+ even in higher dynamics, there will also be a significant increase in the need for nursing hospitals. Hence, Silver Villages should start with constructing LTC facilities for community care as soon as possible. In addition, the state should provide an extension of capacities of DSOs and nursing hospitals at least in the next five years. In line with the demographic trends, it is generally necessary to ensure that the health system has adequate capacity to maintain its current level of services and that standards must be aligned with the changing age structure.

As given in Subchapter 3.1, more than 60% of the respondents in Slovenian rural areas claim that even a better organization of homecare would not allow them to stay at home until death due to inadequately built housing. They are missing a more prolonged presence of caregivers; therefore, only a relative increase in caregivers will not adequately cover the needs. Moreover, due to the large dispersion of older people's homes in rural areas, this problem is even more pressing than home care in cities. Therefore, based on the MTM, we propose building with higher dynamics of DSO and NH capacities, as presented in Table 6. In such a rapidly ageing population, questions arise regarding the standard of care provided by the national insurance schemes and what would be considered above that standard. For investments, the public sources available are European and national, with more significant support from the European Investment Bank, the European Social Fund, and the European Regional Development Fund. The development of innovative financial products and social entrepreneurship programs is of great importance.

4 DISCUSSION

We attempted to answer questions regarding the proper methods that can help in developing optimal decision-making procedures in Slovenia at given constraints, considering (a) how to approach the organization of SSV, (b) how to organize the financial sources to reduce the waiting lines of the older adults for the LTC, and (c) how to find jobs for younger cohorts in the villages, attracting them to stay in rural areas. A network of SSVs as nodes of facilities for older adults who need LTC services is considered. It is assumed to be a platform for the effective use of social resources to raise the quality of life, which would be a part of the modern silver economy (5). There are possibilities to organize and structure financial resources available from (a) European Structural and Investments (ESI) funds, (b) national and local resources, and (c) contributions of older people and their families in LTC, in public-private partnerships, identifying challenges and constraints (3). We highlighted the following question, given in the introduction: "What would be the optimal construction dynamics of the assisted living facilities and the projection of staff needed for eldercare? What are the useful methods that can help develop optimal decision-making procedures at given constraints?" These would be essential questions in the European silver economy. The European initiative of the silver economy (5) and the smart eco-social villages (18, 24-27) supports the idea of faster development of ambient assisted living technologies. These results can be ingredients of an innovative platform of the SSVs, ensuring that the increased needs of the older adults for safety, comfort, and environmentally friendly living is met easily, even though the dynamics of ageing is high. The technologies of SSVs will ensure that the members stay well connected and served by the health and social caregivers. The greenhouses would allow them

to remain dispersed in small villages and hamlets, with travel costs of caregivers reduced. European Smart Village development strategy highlights the issue of innovative approaches to optimal utilization of resources. The plan articulates that the 'Green Care' initiative should be included in the programs as a range of activities "that promotes physical and mental health and well-being through contact with nature" (24-28). Greenhouses could be a part of this mission. Therefore, based on the MTM, we propose to build DSO and NH capacities with higher dynamics, as presented in Table 6. At least for those in category III b of care, DSO and NH should be available, which would provide the opportunity to stay there longer than three months. Posavje needs 30 beds now in NH under the constraint that no one can stay there more than three months. If this restriction no longer existed and those of category III b stayed there as long as needed because this kind of care will keep gradually rising until 2050, at least up to 200 beds will need to be provided in the next 30 years (the optimum would be 308 beds, but a third of them from DSO could still return to DSO if it were adequately adopted, but for those from home care and community care, staying in nursing hospital is the primary option). According to the demographic projection of population ageing at the unchanged longevity of healthy living by age cohorts, the projections follow from the categorization of care needs to be given in (22-23).

Construction of SSVs as an ICT-supported network of dispersed housing and other LTC facilities would retain the older adults in such villages and provide jobs to younger cohorts in the housing construction industry, facilities management, transportation, logistics services, and, especially, in the core LTC activities. Young people who wish to stay in the countryside could contribute to landscape conservation and the rapid population decline. The number of needed employees will rise to more than 800 people in the next 30 years only in the core social care sector, in the Posavje region. The number of persons in healthcare will also grow at least up to 400 employees. In the integrated arrangements, there will be a need for additional training and education and specialization programs. Additionally, younger respondents of our survey have shown great willingness to engage in such cooperation for free, provided that they are equally catered for when they need such assistance in the future; in this case, at least a short training module should be provided.

Consequently, all these projections show the requirement for more intensive educational and training programs for social, nursing, and integrated care. According to our survey of other LAGs, most municipalities in the LAGs under consideration do not implement an active land policy to follow the national housing program needed to achieve the housing stock as projected. Spatial planners have rarely placed LTC facilities in long-term plans of

municipalities. Because they have missed the spatial plans for LTC facilities, municipalities cannot apply today for funding from accessible public funds, such as the National Housing Fund and other resources.

5 CONCLUSION AND FURTHER DIRECTIONS OF ACTIVITIES

We presented how the Multistate Transition Model, as developed here, helps us forecast the structure of population dynamics and the required capacities of housing and human resources for LTC. Because of the ageing population, as also presented for the Posavje region, which is among the youngest, the ratio between active population and population aged 80+ will fall from 12 to 3 in the next 40 years. In such a rapidly ageing population, questions arise regarding the standard of care provided by the national insurance schemes and what would be considered above that standard. When setting up LTC systems in the Slovenian countryside, we must include the decisions in LTC insurance schemes.

In this context, programs for the development and operation of supply networks and integrated social and health infrastructures can be financed from various public and private sources. The public sources available are European and national. The development of innovative financial products and social entrepreneurship programs is of great importance.

The LAGs should develop appropriate rural development programs; additionally, adequate education programs for such development should be designed.

These activities can be financed substantially by the European Social Fund, the European Fund for Regional Development, the European Cohesion Fund, and the European Agricultural Fund for Rural Development. These financial flows combined from pension and the health insurance sources may revitalize the rural areas and provide jobs for young cohorts who will be engaged in providing these services.

It is necessary to engage citizens in community-led local development actions as soon as possible. The LAGs should support them to co-create SSVs with the integrated provision of eldercare services. They should learn how judiciously utilize financial resources from the ESI funds and European Investment Bank. As stated before (24-27), "social policy should encourage the development of formal services in rural areas and elaborate policy measures for informal caregivers," also in greenhouses, which can be a more effective and efficient organization of LTC, as already shown by Hlebec et al. (28).

CONFLICT OF INTEREST

The authors declare that no conflict of interest exists.

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ETHICAL APPROVAL

The principle of informed consent to participate was applied. In addition, ethical principles have been verified by the internal commission.

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